PLANTING SITE CLASSIFICATION AND LONGTIME SPECIES ADAPTATION IN THE PINYON-JUNIPER WOODLAND

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ABSTRACT

Longtime species adaptation trials were conducted from 1945 to 1973 at 10 sites in the Arizona pinyon-juniper woodland. Sites were classified by precipitation, temperature, and soils to facilitate wide application of results. Two hundred and forty species and varieties were tested, 64 persisted for 21 to 28 years, and 62 were still present at the last observation. Fifty-nine were considered adapted because they developed fair to excellent stands and persisted for at least 5 years. Only five of these 59 species were not alive in 1973. Thirty reproduced themselves and spread naturally. The most widely adapted species were *Agropyron smithii*, *A. trichophorum*, *Atriplex canescens*, *Bothriochloa ischaemum*, *Bouteloua curtipendula*, *B. gracilis*, *Muhlenbergia wrightii*, and *Tridens elongatus*.

KEYWORDS: Pinyon-juniper woodland, range improvement, species adaptation, species establishment, species longevity, range seeding, site classification, pinyon-juniper subtypes, site factors, climate, soils.

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PLANTING SITE CLASSIFICATION AND LONGTIME SPECIES ADAPTATION IN THE PINYON-JUNIPER WOODLAND

By Fred Lavin and Thomas N. Johnsen, Jr.[1]

INTRODUCTION

Current interest in environmental restoration has increased the need for information on adapted species that can be used to improve deteriorated or otherwise disturbed rangelands. This paper reports the results of species and variety adaptation tests made at 10 sites in the Arizona pinyon-juniper woodland starting in 1945. At the time of last observations in 1973, plantings were from 21 to 28 years old. Both positive and negative results are given to aid future investigations. Sites are described and classified to facilitate wide application of results.

The long time period (1945 to 1973) covered by this study will help the reader avoid erroneous conclusions based entirely on young plantings of long-lived perennials.

SITE DESCRIPTIONS AND CLASSIFICATION

Study sites were established and planted as follows:

Name	Location	Planted
Buckhead Mesa	5 miles S.E. of Pine	1945-46
Dog Knobs	36 miles N.W. of Flagstaff	1945-52
Drake	2 miles N. of Drake	1948-52
Moritz Lake	6 miles N.E. of Spring Valley	1950
Mud Tanks	25 miles E. of Camp Verde	1949-52
Perkinsville	1 mile S. of Perkinsville	1951-52
Peterson Flat	1 mile S.E. of Pinedale	1946-52
Pine Creek	10 miles N. of Young	1945-46
Pleasant Valley	2 miles E. of Young	1950-52
Sierra Ancha	3 miles S.E. of Sierra Ancha Expt. Forest Headquarters	1947-50

The 10 study sites used are placed into six pinyon-juniper subtypes (table 1)[2] on the basis of temperature and precipitation data adapted from the U.S.

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[1]Range scientist and research agronomist, respectively, Agricultural Research Service, Rocky Mountain Forest and Range Experiment Station, Flagstaff, Ariz.

[2]All numbered tables are in the Appendix, following the text.

National Weather Service.[3] Information from weather stations in the immediate vicinity was used for seven of the sites. For three sites, however, a combination of data from the nearest station and from a more distant station with elevation, physiography, and vegetation similar to the study site were used to extrapolate the needed information.

Sites with a mean annual precipitation of 15 inches or less are classed as dry, and those with 16 inches or more, as moist. Since seasonal distribution is often important, precipitation also is separated into warm season (May through October) and cool season (November through April) amounts. Cool-season precipitation shows the best relationship to subtype for the sites studied.

Mean annual temperatures, July and January means, July daily maximum, and January daily minimum are reported because both mean and extreme temperatures affect plant establishment, vigor, and survival. Pinyon-juniper subtypes based on mean annual and mean January temperatures, in degrees Fahrenheit, are as follows:

Subtype	*Mean annual temperature*	*Mean January temperature*
Cold	49 or less	31 or less
Cool	50 - 53	32 - 35
Warm	54 - 58	36 - 39
Hot	59 or more	40 or more

Elevation affects both temperature and precipitation. Dominant trees and shrubs are site indicators because their distribution shows some relationship to amount and distribution of precipitation.

Range site classification and nomenclature were supplied by the Soil Conservation Service (SCS) at Flagstaff from their compiled descriptions of Arizona range sites (SCS, unpub. material). With this classification, range site delineation is based on a combination of soil, physiography, climate, and natural vegetation.

Soils were described from onsite examination by an SCS soil scientist having a background of lengthy experience with Arizona pinyon-juniper soils (table 2).

Soils at the 10 study sites fall into nine soil series. Soil series at Buckhead Mesa, Dog Knobs, Moritz Lake, Mud Tanks, Perkinsville, and Pine Creek are the same or have similar characteristics. Soil differences among these sites should not be a major factor affecting species adaptation. Peterson Flat and Pleasant Valley have similar soils. Drake and Sierra Ancha soils differ from all the others. All soils are loamy, ranging from clay loam to gravelly loam. Soils are residual at four sites and alluvial at the others. Parent materials are volcanic at six sites and of various mixtures at the other four sites. Soil depth ranges from moderately deep to deep. Erosion potential appears related to soil series. Permeability appears related to texture but available moisture varies.

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[3]Sellers, A. C., Jr., and Hill, Richard H. Arizona climate 1931-1972. Univ. of Ariz. Press, Tucson, Ariz., 616 pp., illus. 1974.

PROCEDURE

Between 1945 and 1950, 10 study sites were established with plantings made through 1952 and observations through 1973. A total of 240 species and recognized varieties were planted on one or more of these sites. Plots used were (1) small dryland nursery plots consisting of three 12-foot rows spaced 1-ft apart for initial tests, and (2) a variety of larger plots up to an acre in size for some of the more promising species. All plots were replicated at least twice in separate blocks at each location.

Initial seedbed preparation consisted of plowing, disking, harrowing, and cultipacking except at Buckhead Mesa and Pine Creek where the seedbed was prepared by disking and harrowing and at Moritz Lake, by plowing with a Wheatland-type plow. Disking and harrowing alone was less effective than plowing for reducing native plant competition. Where original plantings failed, new seedbeds were again prepared by hand hoeing and raking.

In the small nursery plots, rows were made with handtools, and the seed was then planted and covered by hand. In the larger plots, seed was drilled or broadcast and covered by harrowing or cultipacking. Seeding rates varied from approximately 20 to 40 seed per linear foot of row and 30 to 50 seed per square foot of broadcast seeding. Planting depth ranged from about 1/4- to 1-inch, depending on seed size and knowledge of species requirements. No weeding was done after seeding except when replanting.

Plantings were made from late June through July. A few fall plantings also were made at Peterson Flat in September 1946 and at Dog Knobs in both September and October 1946 through 1948. Planting success appears more closely related to precipitation than to actual planting dates.

All study sites, except Moritz Lake which was the only one having no dryland nursery plots, were fenced against livestock. Nursery plantings, except those at Buckhead Mesa and Pine Creek, were additionally fenced with 1-inch mesh wire for protection from rabbits. From the year after planting, Moritz Lake had heavy cattle use June 1 to October 31 each year until 1967 and, then, year-long use.

Numerical relative ratings representing the actual stand in relation to the best possible stand were used to record planting success.[4]

These ratings take into account the number, distribution, and vigor of the seeded plants and are defined as follows: 0 = failure; 1 to 2 = very poor; 3 to 4 = poor; 5 to 6 = fair; 7 to 8 = good; 9 to 10 = excellent. Other pertinent information, such as natural spread, disease, and animal activity, was recorded separately.

All plantings were rated at least twice a year from 1945 through 1953, once in 1954 and 1966, and at irregular intervals the rest of the time. The last ratings were made during September and October 1973.

Many species and varieties, especially those that did not attain a fair or better stand or were destroyed by some biotic agent, were replanted several times. Replicate plantings of all species and varieties were made at each location, with

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[4]Hull, A. C., Jr. Rating seeded stands on experimental range plots. Jour. Range Manage. 7(3): 122-124. 1954.

several accessions planted for many of the species. The best stand for each species and variety at each location was used to standardize, simplify, and shorten summarization (tables 3 and 4).

RESULTS AND DISCUSSION

Of the 240 species and varieties tested, 187 were multiple site plantings (table 3) and 53 were single site plantings (table 4). Of the 196 species and varieties established initially, 62 survived until the last ratings in 1973. Species and variety survival by pinyon-juniper subtype in decreasing order were as follows: Warm-moist, 27 percent; cool-moist, 26 percent; warm-dry, 23 percent; cold-moist, 21 percent; hot-moist, 9 percent; and cold-dry, 6 percent.

Fifty-nine species and varieties were adapted on one or more sites. Adaptation as used here is defined as (1) persisting for at least 5 years with one or more droughts during this time and (2) attaining a relative rating of fair or better. Fifty-four adapted species and varieties of the 59 were still alive in 1973. Five were adapted but did not survive to 1973. The number of adapted species and varieties by sites were as follows: Buckhead Mesa, 10; Dog Knobs, 9; Drake, 18; Moritz Lake, 4; Mud Tanks, 25; Perkinsville, 15; Peterson Flat, 22; Pine Creek, 11; Pleasant Valley, 30; and Sierra Ancha, 12.

Twenty-five species and varieties were adapted to one site only, 11 to two sites, 7 to three sites, 6 to four sites, 3 to five sites, 3 to six sites, 1 to seven sites, 2 to eight sites, and 1 to nine sites; none were adapted to all 10 sites. Number of adapted species and varieties by pinyon-juniper subtype in decreasing order were as follows: Warm-moist, 36; cool-moist, 25; cold-moist, 23; warm-dry, 22; hot-moist, 12; and cold-dry, 9. The most widely adapted species were western wheatgrass (*Agropyron smithii*), pubescent wheatgrass (*A. trichophorum*), fourwing saltbush (*Atriplex canescens*), yellow bluestem (*Bothrichloa ischaemum*), sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), spike muhly (*Muhlenbergia wrightii*), and rough tridens (*Tridens elongatus*).

Thirty of the species and varieties tested reproduced and spread naturally by seed or vegetative means. Those with the most vigorous spread were western wheatgrass, winterfat (*Eurotia lanata*), yellow bluestem, and spike muhly. Some of the tall wheatgrass (*Agropyron elongatum*) at Dog Knobs, Mud Tanks, and Peterson Flat had rhizomes. These plants could have resulted from hybridization with pubescent wheatgrass.

Precipitation and temperature were the main factors affecting site-species adaptation relationships. Soils appeared to have a modifying effect but were not as important.

Adapted species and varieties have survived many adversities. They have overcome conditions unfavorable to germination, emergence, and establishment. Thus, the erratic success of winterfat may be largely due to the rather exacting conditions it requires for initial establishment. All adapted species and varieties have persisted through one or more periods of severe drought. They have withstood competition from weeds and native plants that usually increased throughout the years. Weed competition at Pleasant Valley was especially severe because the planting was in an old abandoned cultivated field. Observations have shown varying amounts of disease, insect, rodent, rabbit, and big game activity at each site. For example, failure of the otherwise adapted alfalfa

(*Medicago sativa*) varieties in the warm-moist subtype resulted mainly from gopher and rabbit damage. Animals were especially detrimental because they concentrated from large areas and exerted heavy grazing pressure on the small plantings.

Because most of the plantings were protected from livestock grazing, consideration must be given to the possible effects of nonuse on species adaptation. The different species and varieties tested undoubtedly vary in their tolerance to livestock grazing. Depending on relative palatability and grazing tolerance, competition to planted stands from weeds and native vegetation could be either intensified or diminished. Some dense bunchgrasses decline and often die because the old foliage when not removed by grazing smothers out the new growth. Also, nonuse appears to hasten senescence and increase mortality for some shrub species.

The fact that some species failed in these tests is not conclusive proof that they are not adapted to the planting site. Some may require special seed treatment or planting techniques for successful establishment. Others might have survived in larger plantings where wild animal concentration and depredation was not so severe. Moderate livestock grazing might be essential to some bunchgrasses and shrubs for longtime persistence with good vigor. On the other hand, species and variety survival in acceptable stands is good evidence that they are adapted to the site except that reaction to livestock grazing is undetermined. Additionally, natural selection has occurred under severe environmental conditions so that these old plantings form a good genetic pool from which to derive new strains better suited for seeding on pinyon-juniper rangelands.

APPENDIX

TABLE 1.--*Climatic classification and description of study sites*

Subtype and study site	Elevation	Range site[1]	Dominant trees and shrubs[2]	Precipitation means[3]			Temperature means[3]				
				Annual	Warm season[4]	Cool season[5]	Annual	July	January	Daily maximum[6]	Daily minimum[7]
	Feet			*Inches*	*Inches*	*Inches*	°*F*	°*F*	°*F*	°*F*	°*F*
Cold-moist:											
Moritz Lake	6,600	Clay loam upland	Jumo, Juos, Pied	16	9	7	49	70	30	85	19
Peterson Flat	6,500	Clay bottom	Jude, Jumo, Pied	17	10	7	49	69	29	86	15
Cold-dry:											
Dog Knobs	6,400	Clay loam upland	Jumo, Pied	12	8	4	49	70	31	87	16
Cool-moist:											
Mud Tanks	5,900	--do--	Jude	18	9	9	52	71	32	88	17
Warm-moist:											
Pine Creek	5,200	Loamy upland	Jude, Jumo	20	10	10	54	73	36	89	18
Pleasant Valley	5,000	Loamy bottom	--do--	19	10	9	54	73	36	90	19
Buckhead Mesa	4,700	Clay loam upland	--do--	20	10	10	54	74	36	92	20
Warm-dry:											
Drake	4,600	--do--	Juos	13	8	5	54	75	36	93	20
Perkinsville	4,000	Limy and loamy uplands	--do--	13	7	6	57	79	39	96	22
Hot-moist:											
Sierra Ancha	4,600	Loamy upland	Qutu, Jumo, Jude	17	8	9	60	78	43	92	31

[1]USDA, Soil Conservation Service, Range Site Classification. Unpublished.
[2]Jude = *Juniperus deppeana*; Jumo = *J. monosperma*; Juos = *J. osteosperma*; Qutu = *Quercus turbinella*; Pied = *Pinus edulis*.
[3]Adapted from Sellers, W. D., and Hill, R. H. Arizona climate, 1931-1972. Ed. 2, 616 pp., illus. Tucson, Ariz. 1974.
[4]Six-month period starting May 1 and ending October 31.
[5]Six-month period starting November 1 and ending April 30.
[6]For July.
[7]For January.

TABLE 2.--*Soil classification and description for species adaptation study sites*

Location and soil series	Texture	Soil classification	Parent materials	Permeability	Available moisture content	Depth	Erosion potential	Range site
MUD TANKS								
Thunderbird	Gravelly clay loam, clay loam	Fine, montmorillonitic, mesic, Aridic Argiustolls	Residual, basalt and cinders	Very slow	Poor	Deep	Low-moderate	Clay loam upland.
BUCKHEAD MESA								
Thunderbird	Clay loam	--do--	--do--	--do--	--do--	Moderately deep	--do--	Do.
DOG KNOBS								
Thunderbird	--do--	--do--	--do--	--do--	--do--	--do--	--do--	Do.
PINE CREEK								
Showlow	Gravelly loam	--do--	Eroded alluvium, mixed materials	Moderately slow	Good	Deep	Moderate	Loamy upland.
MORITZ LAKE								
Sponsellor, warm varient	Silt loam	Fine-loamy, mixed, Aridic Argiustolls	Alluvium from rhyolite and basalt	--do--	Poor	Moderately deep	Low-moderate	Clay loam upland.
SIERRA ANCHA								
White House	Very gravelly loam	Fine, mixed, thermic Ustollic Haplargids	Alluvium, mixed materials	--do--	Good	Deep	Moderate	Loamy upland.
PETERSON FLAT								
Jacques	Loam	Fine, mixed, mesic Cumulic Haplustolls	Alluvium from limestone and basalt	Slow	--do--	--do--	High	Clay bottom.
PLEASANT VALLEY								
Lynx	--do--	Fine-loamy, mixed, mesic Cumulic Haplustolls	Alluvium from basalt and cinders	Moderately slow	Moderate	--do--	Moderate-high	Loamy bottom.
PERKINSVILLE								
Abra	--do--	Fine-loamy, mixed, mesic Ustollic Calciorthids	Alluvium, mixed materials	Moderate	Poor	--do--	--do--	Limy upland.
Partri	Clay loam	Fine, mixed, mesic Aridic Argiustolls	--do--	--do--	--do--	--do--	--do--	Loamy upland.
DRAKE								
Tajo	Gravelly loam	Fine-loamy, mixed, mesic Petrocalcic Paleustolls	Residual, basalt and cinders	Moderately slow - very slow	Moderate - good	--do--	--do--	Clay loam upland.

TABLE 3.--*Final rating, planting year, maximum rating, and*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating[1]	Maximum rating[2]	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Species and varieties planted at nine or more sites:								
Agropyron desertorum	3 (45)	8 (6)	6 (45)	9 (3)	1 (48)	6 (2)	3 (50)	8 (2)
A. intermedium	0 (46)	9 (4)	[3]6 (46)	10 (3)	0 (48)	8 (2)	0 (50)	7 (0)
A. smithii	[3]10 (45)	10 (21)	[3]10 (45)	10 (21)	[3]8 (48)	10 (18)	[3]5 (50)	5 (23)
A. trichophorum	0 (46)	9 (5)	0 (47)	8 (13)	[3]5 (50)	8 (16)	1 (50)	7 (3)
Atriplex canescens	0 (46)	0 (0)	9 (45)	10 (21)	8 (48)	10 (18)	6 (50)	8 (13)
Bothriochloa ischaemum	[5]10 (45)	10 (21)	0 (47)	5 (6)	[5]8 (51)	8 (0)	-	-
Bouteloua eriopoda	0 (45)	5 (2)	0 (51)	8 (0)	4 (50)	6 (1)	-	-
B. gracilis	5 (45)	8 (8)	0 (49)	8 (0)	8 (50)	10 (16)	0 (50)	6 (1)
Eragrostis curvula	5 (45)	10 (21)	0 (49)	10 (0)	0 (51)	8 (0)	-	-
E. intermedia	0 (46)	8 (4)	0 (49)	8 (1)	0 (50)	0 (0)	-	-
E. trichodes	0 (46)	7 (4)	0 (51)	8 (0)	0 (51)	8 (0)	-	-
Muhlenbergia wrightii	-	-	[5]9 (51)	10 (6)	4 (51)	8 (0)	[5]5 (50)	7 (13)
Panicum obtusum	0 (45)	9 (21)	0 (47)	6 (0)	0 (48)	9 (15)	-	-
Purshia tridentata	0 (46)	0 (0)	0 (47)	6 (0)	2 (48)	8 (3)	-	-
Tridens albescens	0 (45)	7 (4)	0 (47)	5 (0)	0 (51)	8 (0)	-	-
T. elongatus	0 (45)	5 (8)	0 (47)	8 (0)	0 (51)	8 (12)	-	-
Species and varieties planted at two to eight sites:								
Agropyron cristatum	-	-	0 (47)	7 (2)	0 (48)	7 (2)	0 (50)	5 (1)
A. dasystachyum	-	-	-	-	-	-	-	-
A. elongatum	-	-	[3,5]9 (47)	9 (26)	0 (48)	9 (3)	0 (50)	6 (3)
A. inerme	-	-	0 (47)	7 (2)	0 (48)	1 (4)	0 (50)	6 (2)
A. intermedium-Amur	-	-	0 (50)	7 (1)	0 (50)	5 (2)	-	-

See footnotes at end of table.

maximum rating age for plantings at 10 pinyon-juniper sites

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
7	10	1	9	7	10	5	8	1	9	0	3
(49)	(2)	(51)	(0)	(46)	(3)	(45)	(6)	(50)	(1)	(47)	(1)
[3]7	10	0	10	0	10	0	10	[3]6	8	0	0
(49)	(2)	(51)	(0)	(46)	(4)	(46)	(5)	(50)	(16)	(47)	(0)
[3]9	10	[3]10	10	[3]10	10	[3]10	10	[3]10	10	0	0
(49)	(17)	(51)	(22)	(47)	(26)	(45)	(21)	(50)	(16)	(47)	(0)
[3]9	10	4	10	[3]8	8	[3]10	10	[3]6	10	0	0
(49)	(17)	(51)	(0)	(46)	(4)	(46)	(20)	(50)	(16)	(47)	(0)
7	10	10	10	4	8	0	0	8	10	[4]-	-
(49)	(17)	(51)	(15)	(50)	(1)	(46)	(0)	(50)	(16)		
[5]10	10	[5]10	10	[5]5	5	0	0	[5]10	10	[5]7	8
(49)	(17)	(51)	(22)	(50)	(0)	(46)	(0)	(50)	(16)	(49)	(4)
0	9	4	7	4	7	0	5	0	8	0	2
(51)	(0)	(51)	(0)	(50)	(15)	(46)	(0)	(50)	(4)	(49)	(2)
3	8	2	9	7	9	0	7	5	10	4	8
(49)	(0)	(51)	(15)	(46)	(8)	(46)	(5)	(50)	(3)	(48)	(0)
0	10	0	5	0	9	7	10	5	10	0	4
(49)	(0)	(51)	(0)	(50)	(0)	(46)	(20)	(50)	(5)	(49)	(2)
0	6	0	7	0	7	0	9	0	7	0	0
(49)	(0)	(51)	(0)	(50)	(0)	(46)	(0)	(50)	(1)	(47)	(0)
0	6	0	6	0	8	0	9	0	6	0	6
(49)	(0)	(51)	(0)	(50)	(0)	(46)	(0)	(50)	(3)	(48)	(0)
[5]10	10	0	6	[5]10	10	[5]7	7	[5]10	10	0	0
(49)	(17)	(51)	(0)	(46)	(22)	(45)	(28)	(50)	(16)	(49)	(0)
0	1	0	5	0	4	0	4	0	5	[3]3	10
(50)	(16)	(51)	(0)	(50)	(0)	(46)	(0)	(50)	(2)	(49)	(17)
0	0	0	0	5	8	0	0	0	0	0	0
(50)	(0)	(51)	(0)	(47)	(6)	(46)	(0)	(50)	(0)	(47)	(0)
0	8	0	6	0	6	0	4	0	9	0	7
(49)	(0)	(51)	(10)	(51)	(0)	(46)	(5)	(50)	(3)	(49)	(9)
[5]6	6	6	8	0	8	0	8	[5]7	8	1	6
(50)	(1)	(51)	(10)	(50)	(0)	(46)	(20)	(50)	(3)	(49)	(5)
2	10	1	9	0	10	-	-	0	4	0	0
(49)	(2)	(51)	(0)	(47)	(2)			(50)	(1)	(47)	(0)
0	8	-	-	0	9	-	-	0	5	-	-
(49)	(2)			(51)	(0)			(50)	(1)		
[3,5]8	10	0	9	[3,5]6	9	-	-	1	9	-	-
(49)	(3)	(51)	(0)	(46)	(4)			(50)	(2)		
0	8	-	-	0	10	-	-	0	6	0	0
(49)	(2)			(46)	(3)			(50)	(2)	(47)	(0)
2	8	0	9	0	9	-	-	0	8	-	-
(50)	(4)	(51)	(0)	(50)	(0)			(50)	(2)		

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Agropyron intermedium-Ree	-	-	0 (47)	7 (1)	0 (48)	6 (1)	-	-
A. popovii	-	-	4 (50)	8 (2)	0 (50)	7 (16)	-	-
A. repens	-	-	0 (49)	0 (0)	-	-	-	-
A. riparium	-	-	0 (50)	0 (0)	0 (50)	0 (0)	-	-
A. semicostatum	-	-	0 (47)	5 (1)	-	-	-	-
A. sibiricum	-	-	2 (47)	9 (2)	0 (48)	7 (2)	0 (50)	7 (2)
A. spicatum	-	-	0 (50)	0 (0)	0 (50)	0 (0)	0 (50)	3 (4)
A. subsecundum	-	-	0 (47)	3 (1)	-	-	-	-
A. trachycaulum	-	-	0 (48)	8 (2)	0 (51)	5 (0)	0 (50)	6 (2)
A. trachycaulum-Primar	-	-	0 (49)	1 (1)	-	-	-	-
Andropogon barbinodis	-	-	0 (47)	7 (0)	0 (51)	6 (0)	-	-
A. gerardii	-	-	-	-	-	-	-	-
A. hallii	-	-	0 (46)	5 (0)	0 (51)	5 (0)	-	-
A. saccharoides	-	-	0 (47)	4 (0)	0 (48)	0 (0)	-	-
A. scoparius	-	-	0 (47)	6 (0)	0 (48)	0 (0)	-	-
Arrhenatherum elatius	-	-	0 (47)	6 (0)	-	-	-	-
Astragalus cicer	-	-	-	-	-	-	-	-
A. falcatus	-	-	-	-	-	-	-	-
A. nuttallianus	-	-	0 (47)	7 (0)	0 (48)	0 (0)	-	-
Astrebla elymoides	-	-	-	-	0 (48)	1 (1)	-	-
Atriplex confertifolia	-	-	0 (47)	1 (1)	-	-	-	-
A. halimus	-	-	0 (49)	0 (0)	-	-	-	-
A. semibaccata	-	-	0 (51)	1 (0)	0 (50)	0 (0)	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
[3]5 (49)	9 (5)	-	-	[3]8 (47)	10 (2)	-	-	2 (50)	7 (1)	0 (47)	0 (0)
7 (50)	8 (4)	[3]7 (51)	9 (0)	0 (50)	8 (0)	-	-	[3]6 (50)	9 (16)	-	-
0 (49)	10 (1)	-	-	0 (50)	8 (0)	-	-	0 (50)	1 (0)	-	-
0 (49)	5 (3)	-	-	0 (50)	0 (0)	-	-	0 (50)	5 (0)	-	-
0 (50)	4 (0)	-	-	0 (47)	7 (1)	-	-	0 (50)	0 (0)	0 (47)	0 (0)
[5]6 (49)	10 (2)	-	-	0 (47)	9 (2)	-	-	0 (50)	6 (2)	0 (49)	0 (0)
0 (50)	5 (2)	-	-	0 (46)	6 (3)	-	-	0 (50)	6 (3)	-	-
-	-	-	-	0 (46)	1 (3)	-	-	0 (50)	0 (0)	-	-
0 (49)	10 (0)	-	-	0 (47)	9 (3)	-	-	0 (50)	1 (0)	-	-
0 (49)	10 (1)	0 (51)	9 (0)	-	-	-	-	0 (50)	5 (0)	-	-
0 (51)	6 (0)	0 (51)	9 (0)	0 (47)	0 (0)	-	-	1 (50)	6 (4)	0 (47)	1 (0)
0 (49)	0 (0)	-	-	0 (50)	0 (0)	-	-	0 (50)	1 (16)	-	-
0 (49)	0 (0)	0 (51)	8 (0)	0 (47)	1 (0)	-	-	[3]10 (50)	10 (16)	-	-
-	-	-	-	0 (47)	0 (0)	-	-	-	-	0 (47)	0 (0)
0 (49)	0 (0)	-	-	0 (47)	1 (1)	-	-	5 (50)	5 (2)	-	-
-	-	-	-	0 (47)	6 (2)	-	-	-	-	-	-
0 (50)	5 (0)	-	-	0 (50)	4 (0)	-	-	-	-	-	-
-	-	-	-	0 (50)	2 (2)	-	-	0 (50)	4 (1)	-	-
-	-	-	-	0 (47)	0 (0)	-	-	-	-	0 (49)	1 (2)
-	-	-	-	-	-	-	-	-	-	0 (49)	1 (2)
-	-	-	-	0 (47)	0 (0)	-	-	0 (50)	0 (0)	-	-
0 (49)	0 (0)	-	-	-	-	-	-	0 (50)	0 (0)	-	-
0 (50)	0 (0)	0 (51)	5 (0)	0 (50)	5 (0)	-	-	0 (50)	1 (1)	0 (47)	0 (0)

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Bothriochloa caucasicas	-	-	0 (47)	1 (0)	0 (50)	0 (0)	-	-
B. ischaemum-King Ranch	-	-	0 (51)	8 (0)	0 (51)	8 (0)	-	-
Bouteloua curtipendula	4 (45)	9 (5)	0 (51)	9 (0)	7 (50)	7 (23)	-	-
B. curtipendula-Tucson	-	-	0 (47)	6 (0)	3 (50)	10 (16)	-	-
B. curtipendula-Vaughn	-	-	-	-	10 (51)	10 (9)	-	-
B. eludens	-	-	-	-	0 (50)	0 (0)	-	-
B. filiformis	0 (46)	0 (0)	-	-	0 (51)	0 (0)	-	-
B. gracilis-Lovington	-	-	0 (51)	8 (0)	5 (51)	9 (12)	0 (50)	3 (0)
B. hirsuta	0 (46)	5 (1)	0 (47)	4 (0)	0 (50)	0 (0)	-	-
B. radicosa	-	-	-	-	0 (48)	0 (0)	-	-
B. rothrockii	-	-	0 (47)	1 (0)	0 (50)	0 (0)	-	-
Brassica alba	-	-	-	-	-	-	-	-
B. arvensis	-	-	0 (49)	5 (0)	-	-	-	-
B. hirta	-	-	0 (49)	3 (0)	0 (48)	0 (0)	-	-
B. nigra	-	-	0 (49)	4 (0)	-	-	-	-
Bromus carinatus	-	-	0 (46)	6 (0)	-	-	-	-
B. catharticus	-	-	0 (47)	7 (0)	-	-	-	-
B. erectus	-	-	0 (47)	6 (1)	-	-	-	-
B. inermis	0 (46)	7 (1)	0 (48)	8 (1)	-	-	-	-
B. inermis-Achenbach	-	-	-	-	-	-	-	-
B. marginatus	-	-	-	-	-	-	-	-
Buchloe dactyloides	-	-	0 (47)	7 (0)	[3]10 (51)	10 (22)	-	-
Calliandra eriophylla	-	-	0 (46)	0 (0)	0 (48)	0 (0)	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
0 (50)	7 (16)	0 (51)	8 (0)	0 (47)	1 (1)	-	-	0 (50)	10 (16)	0 (49)	9 (9)
[5]8 (49)	9 (17)	0 (51)	7 (0)	0 (50)	5 (0)	-	-	[5]8 (50)	10 (8)	0 (49)	8 (17)
1 (50)	9 (16)	-	-	0 (46)	1 (8)	0 (46)	4 (20)	[5]5 (50)	10 (3)	4 (48)	8 (10)
0 (50)	7 (0)	8 (51)	9 (0)	0 (50)	9 (0)	-	-	0 (50)	10 (3)	4 (47)	7 (7)
-	-	[5]10 (51)	10 (22)	5 (50)	7 (15)	-	-	0 (50)	9 (16)	-	-
-	-	-	-	-	-	-	-	0 (50)	4 (2)	-	-
-	-	-	-	-	-	-	-	0 (50)	10 (0)	0 (49)	1 (2)
4 (51)	8 (0)	7 (51)	10 (15)	0 (50)	9 (4)	-	-	6 (50)	10 (4)	-	-
-	-	-	-	0 (46)	1 (1)	0 (46)	5 (0)	0 (50)	8 (0)	0 (47)	0 (0)
-	-	-	-	-	-	-	-	0 (50)	7 (2)	-	-
-	-	-	-	-	-	-	-	-	-	0 (49)	8 (2)
0 (49)	6 (0)	-	-	-	-	-	-	0 (50)	9 (0)	-	-
0 (49)	10 (0)	-	-	-	-	-	-	0 (50)	8 (0)	-	-
-	-	-	-	-	-	-	-	-	-	-	-
0 (49)	8 (0)	-	-	-	-	-	-	0 (50)	9 (0)	-	-
-	-	-	-	0 (47)	9 (2)	-	-	-	-	0 (47)	0 (0)
-	-	-	-	0 (47)	8 (0)	-	-	-	-	0 (47)	0 (0)
-	-	-	-	0 (47)	7 (4)	-	-	0 (51)	4 (0)	0 (47)	1 (5)
0 (49)	0 (0)	-	-	6 (46)	8 (1)	0 (46)	7 (0)	0 (51)	6 (0)	-	-
5 (51)	8 (0)	-	-	3 (51)	9 (2)	-	-	0 (50)	6 (1)	-	-
-	-	-	-	0 (47)	8 (1)	-	-	-	-	0 (47)	1 (1)
[3]9 (49)	10 (17)	[3]6 (51)	9 (15)	0 (50)	8 (3)	-	-	0 (50)	8 (4)	-	-
-	-	-	-	-	-	-	-	-	-	0 (47)	0 (0)

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Caragana arborescens	-	-	0 (49)	3 (0)	-	-	-	-
Ceanothus greggii	-	-	0 (47)	0 (0)	0 (48)	0 (0)	-	-
Cenchrus biflorus	-	-	0 (47)	7 (0)	-	-	-	-
Cercocarpus breviflorus	-	-	0 (49)	0 (0)	0 (48)	0 (0)	-	-
Chloris berroi	-	-	-	-	0 (50)	0 (0)	-	-
C. cucullata	-	-	0 (46)	0 (0)	0 (48)	0 (0)	-	-
Crotalaria pumila	-	-	0 (47)	5 (1)	0 (48)	0 (0)	-	-
Dactylis glomerata	-	-	0 (47)	4 (0)	-	-	-	-
Dalea wislizeni	-	-	0 (49)	0 (0)	0 (48)	0 (0)	-	-
Danthonia californica	-	-	0 (49)	0 (0)	0 (50)	0 (0)	-	-
Desmodium batocaulon	-	-	-	-	0 (48)	0 (0)	-	-
D. cinerascens	-	-	-	-	0 (48)	0 (0)	-	-
Digitaria eriantha	-	-	0 (50)	0 (0)	0 (50)	0 (0)	-	-
Elymus canadensis	-	-	0 (47)	6 (1)	-	-	-	-
E. glaucus	-	-	0 (47)	3 (1)	-	-	-	-
E. junceus	-	-	4 (47)	10 (2)	0 (50)	6 (1)	5 (50)	10 (16)
E. sibiricus	-	-	0 (47)	1 (1)	-	-	-	-
E. triticoides	-	-	0 (47)	1 (0)	-	-	-	-
Eragrostis bicolor	-	-	0 (51)	7 (0)	0 (51)	5 (0)	-	-
E. brizantha	-	-	0 (49)	0 (0)	0 (48)	0 (0)	-	-
E. chloromelas	-	-	0 (47)	6 (0)	0 (51)	7 (0)	-	-
E. lehmanniana	-	-	-	-	0 (48)	1 (0)	-	-
E. superba	-	-	-	-	0 (48)	0 (0)	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites-Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
-	-	-	-	-	-	-	-	0 (50)	0 (0)	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	0 (49)	1 (2)
-	-	-	-	0 (47)	1 (0)	-	-	-	-	-	-
0 (50)	4 (0)	-	-	-	-	-	-	0 (50)	1 (3)	0 (49)	0 (0)
0 (50)	6 (0)	-	-	-	-	-	-	0 (50)	8 (3)	-	-
-	-	-	-	-	-	-	-	-	-	0 (48)	10 (0)
-	-	-	-	0 (51)	8 (1)	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
0 (51)	4 (0)	0 (51)	0 (0)	0 (51)	1 (0)	-	-	0 (50)	0 (0)	-	-
-	-	-	-	-	-	-	-	-	-	0 (47)	0 (0)
-	-	-	-	-	-	-	-	0 (50)	0 (0)	0 (47)	1 (1)
0 (50)	9 (0)	0 (51)	9 (0)	-	-	-	-	1 (50)	10 (3)	0 (49)	0 (0)
-	-	-	-	0 (47)	8 (2)	-	-	0 (47)	0 (0)	0 (47)	0 (0)
-	-	-	-	0 (50)	7 (0)	-	-	-	-	0 (47)	0 (0)
[5]9 (49)	9 (17)	[5]6 (51)	9 (15)	0 (47)	9 (6)	-	-	0 (50)	6 (1)	0 (47)	0 (0)
-	-	-	-	0 (47)	1 (2)	-	-	-	-	-	-
-	-	-	-	0 (47)	4 (1)	-	-	-	-	-	-
0 (51)	8 (0)	0 (51)	5 (0)	0 (51)	6 (0)	-	-	0 (50)	9 (3)	0 (49)	3 (3)
-	-	-	-	-	-	-	-	-	-	0 (49)	7 (2)
0 (50)	7 (1)	0 (51)	6 (0)	0 (50)	7 (0)	-	-	0 (50)	10 (5)	[5]10 (48)	10 (18)
0 (49)	0 (0)	-	-	-	-	0 (46)	4 (5)	-	-	0 (49)	10 (17)
-	-	-	-	-	-	-	-	0 (50)	0 (0)	[5]8 (49)	10 (17)

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Erodium cicutarium	-	-	0 (49)	4 (0)	0 (48)	1 (1)	-	-
Eurotia lanata	-	-	[5]10 (49)	10 (17)	[5]5 (50)	6 (13)	- -	- -
Festuca arundinaceae	-	-	-	-	-	-	-	-
F. elatior	-	-	0 (47)	3 (0)	-	-	-	-
F. idahoensis	-	-	-	-	-	-	-	-
F. ovina	-	-	-	-	-	-	0 (50)	1 (3)
F. ovina-duriuscula	-	-	-	-	-	-	-	-
F. ovina-sulcata	-	-	-	-	-	-	-	-
Garrya wrightii	-	-	0 (47)	1 (0)	0 (48)	0 (0)	-	-
Heteropogon contortus	0 (46)	3 (1)	-	-	-	-	-	-
Hilaria belangeri	-	-	0 (47)	1 (0)	0 (50)	0 (0)	-	-
H. jamesii	-	-	0 (47)	6 (0)	0 (50)	1 (3)	0 (50)	1 (0)
H. mutica	-	-	0 (49)	1 (0)	0 (48)	0 (0)	-	-
Holcus lanatus	-	-	0 (47)	1 (0)	-	-	-	-
Hordeum bulbosum	-	-	0 (47)	7 (0)	-	-	-	-
Kochia scoparia	-	-	0 (50)	5 (0)	0 (51)	8 (0)	-	-
Koeleria cristata	-	-	0 (49)	4 (2)	-	-	-	-
Lathyrus hirsutus	-	-	0 (47)	7 (0)	0 (48)	0 (0)	-	-
Lespedeza stipulacea	-	-	0 (47)	4 (0)	-	-	-	-
L. striata	-	-	0 (47)	4 (0)	-	-	-	-
Lolium multiflorum	-	-	0 (47)	3 (0)	-	-	-	-
L. perenne	-	-	0 (47)	5 (0)	-	-	-	-
Lotus corniculatus	-	-	0 (46)	5 (0)	-	-	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
-	-	-	-	0 (46)	1 (2)	-	-	-	-	-	-
0 (49)	0 (0)	[5]10 (51)	10 (15)	0 (47)	0 (0)	-	-	0 (50)	1 (16)	0 (47)	0 (0)
-	-	-	-	0 (47)	7 (3)	-	-	0 (51)	4 (0)	-	-
-	-	-	-	0 (47)	7 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	5 (0)	-	-	0 (51)	0 (0)	-	-
-	-	-	-	0 (50)	9 (0)	-	-	-	-	-	-
[5]10 (51)	10 (22)	-	-	1 (50)	5 (0)	-	-	0 (51)	1 (15)	-	-
[5]10 (51)	10 (15)	-	-	5 (50)	5 (23)	-	-	0 (51)	1 (0)	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	0 (46)	9 (0)	-	-	0 (47)	3 (0)
0 (50)	4 (0)	-	-	0 (47)	0 (0)	-	-	0 (50)	9 (3)	0 (47)	8 (1)
0 (50)	4 (0)	-	-	0 (50)	7 (0)	-	-	7 (50)	9 (16)	-	-
-	-	-	-	0 (47)	1 (2)	-	-	5 (50)	5 (16)	-	-
-	-	-	-	0 (47)	5 (0)	-	-	-	-	-	-
0 (49)	7 (2)	-	-	0 (50)	6 (0)	-	-	0 (50)	9 (0)	-	-
0 (50)	7 (1)	0 (51)	9 (0)	0 (50)	0 (0)	-	-	0 (50)	9 (0)	-	-
0 (51)	1 (1)	-	-	[5]5 (46)	6 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	5 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	4 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	1 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	8 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	8 (0)	-	-	-	-	-	-
-	-	-	-	0 (50)	4 (0)	-	-	-	-	-	-

TABLE 3.-- *Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Lotus humistratus	-	-	0 (47)	7 (0)	0 (51)	1 (0)	-	-
L. rigidus	-	-	0 (47)	7 (0)	0 (50)	0 (0)	-	-
Lycurus phleoides	0 (46)	7 (1)	0 (47)	1 (1)	0 (48)	0 (0)	-	-
Medicago falcata	-	-	0 (46)	7 (0)	-	-	-	-
M. lupulina	-	-	0 (46)	6 (0)	-	-	-	-
M. sativa-Grimm	-	-	-	-	-	-	-	-
M. sativa-Peruvian	-	-	-	-	-	-	-	-
Melica bulbosa	-	-	-	-	-	-	-	-
Melilotus alba	-	-	0 (49)	10 (0)	-	-	-	-
M. officinalis	-	-	0 (49)	10 (0)	-	-	-	-
Menodora laevis	-	-	0 (47)	0 (0)	0 (48)	0 (0)	-	-
M. longiflora	-	-	0 (49)	0 (0)	0 (48)	0 (0)	-	-
M. scabra	-	-	0 (51)	1 (0)	0 (51)	7 (0)	-	-
M. scoparia	-	-	0 (51)	1 (0)	0 (48)	0 (0)	-	-
Muhlenbergia dubia	-	-	0 (47)	0 (0)	0 (48)	0 (0)	-	-
M. pauciflora	-	-	-	-	0 (51)	0 (0)	-	-
M. porteri	-	-	0 (49)	0 (0)	0 (51)	1 (0)	-	-
M. rigens	0 (45)	9 (21)	0 (47)	0 (0)	0 (48)	0 (0)	-	-
Onobrychis chorassanica	-	-	0 (47)	8 (2)	4 (48)	6 (2)	-	-
O. viciaefolia	-	-	0 (47)	6 (2)	4 (51)	5 (1)	-	-
Oryzopsis coerulescens	-	-	0 (47)	4 (0)	0 (48)	8 (1)	-	-
O. hymenoides	-	-	0 (47)	7 (0)	3 (48)	7 (1)	0 (50)	1 (10)
O. micrantha	-	-	0 (49)	0 (0)	0 (48)	0 (0)	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
-	-	-	-	-	-	-	-	0 (50)	1 (3)	0 (47)	0 (0)
-	-	-	-	-	-	-	-	0 (50)	1 (1)	0 (47)	0 (0)
-	-	-	-	0 (47)	1 (2)	0 (46)	9 (0)	0 (50)	9 (3)	0 (47)	1 (0)
6 (49)	10 (17)	-	-	3 (50)	7 (2)	-	-	0 (50)	10 (2)	-	-
0 (51)	8 (0)	-	-	0 (47)	8 (2)	-	-	0 (51)	7 (1)	0 (47)	2 (1)
3 (51)	8 (0)	-	-	0 (50)	8 (0)	-	-	0 (51)	8 (0)	-	-
0 (51)	7 (0)	-	-	0 (50)	8 (0)	-	-	0 (51)	8 (1)	-	-
-	-	-	-	0 (46)	0 (0)	-	-	-	-	0 (47)	0 (0)
0 (49)	9 (1)	-	-	[5]9 (46)	10 (3)	[5]10 (46)	10 (27)	0 (50)	10 (0)	-	-
0 (49)	9 (1)	-	-	0 (47)	10 (2)	[5]10 (46)	10 (27)	0 (50)	10 (0)	-	-
-	-	-	-	-	-	-	-	0 (50)	4 (2)	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	0 (51)	9 (0)	-	-	-	-	10 (50)	10 (23)	0 (47)	0 (0)
-	-	0 (51)	0 (0)	0 (47)	0 (0)	-	-	0 (50)	4 (4)	0 (47)	0 (0)
-	-	-	-	-	-	-	-	-	-	-	-
0 (49)	0 (0)	-	-	-	-	-	-	0 (50)	1 (16)	-	-
0 (49)	0 (0)	-	-	-	-	-	-	0 (50)	4 (0)	0 (49)	1 (3)
0 (49)	0 (0)	-	-	0 (47)	0 (0)	0 (46)	1 (4)	-	-	-	-
0 (50)	5 (1)	0 (51)	8 (0)	0 (51)	6 (0)	-	-	0 (50)	7 (1)	0 (47)	1 (0)
0 (49)	5 (2)	0 (51)	6 (0)	0 (50)	9 (0)	-	-	0 (50)	8 (1)	0 (47)	0 (0)
0 (50)	4 (1)	0 (51)	4 (0)	0 (46)	1 (5)	-	-	0 (50)	0 (0)	0 (47)	0 (0)
0 (49)	6 (2)	0 (51)	5 (0)	0 (47)	7 (1)	-	-	0 (50)	1 (1)	0 (47)	3 (2)
-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Oryzopsis miliacea	0 (46)	5 (1)	0 (47)	5 (0)	0 (50)	0 (0)	-	-
Panicum antidotale	-	-	0 (47)	6 (0)	0 (48)	3 (1)	-	-
P. bulbosum minus	-	-	0 (49)	0 (0)	0 (50)	0 (0)	-	-
P. hallii	-	-	0 (49)	5 (1)	[5]5 (50)	8 (3)	-	-
P. plenum	-	-	0 (47)	5 (0)	0 (48)	1 (1)	-	-
P. virgatum	-	-	0 (47)	8 (0)	[3]5 (48)	6 (14)	-	-
Pappophorum mucronulatum	-	-	0 (47)	1 (0)	0 (48)	0 (0)	-	-
P. wrightii	-	-	0 (47)	1 (0)	0 (48)	0 (0)	-	-
Phaseolus acutifolius	-	-	0 (49)	1 (0)	0 (48)	0 (0)	-	-
Phleum boehmeri	-	-	0 (47)	0 (0)	-	-	-	-
Poa ampla	-	-	0 (47)	1 (1)	-	-	0 (50)	3 (3)
P. arida	-	-	0 (47)	0 (0)	-	-	-	-
P. bulbosa	-	-	0 (49)	0 (0)	0 (51)	0 (0)	-	-
P. fendleriana	-	-	0 (47)	1 (0)	-	-	-	-
P. nevadensis	-	-	0 (49)	1 (0)	-	-	-	-
P. secunda	-	-	0 (47)	1 (0)	-	-	-	-
Sanguisorba minor	-	-	0 (51)	4 (0)	0 (51)	7 (2)	-	-
Secale cereale	-	-	0 (48)	10 (1)	0 (48)	5 (1)	0 (50)	10 (0)
S. montanum	-	-	0 (47)	7 (1)	-	-	0 (50)	7 (3)
Setaria macrostachya	-	-	0 (47)	8 (0)	0 (50)	7 (1)	-	-
Sitanion hystrix	-	-	0 (47)	5 (3)	5 (48)	7 (1)	-	-
Sorghastrum nutans	-	-	0 (47)	4 (0)	0 (48)	0 (0)	-	-
Sorghum halepense	-	-	0 (47)	6 (1)	0 (48)	9 (1)	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
-	-	-	-	0 (47)	0 (0)	0 (46)	0 (0)	-	-	-	-
0 (50)	8 (0)	-	-	0 (50)	0 (0)	-	-	0 (50)	10 (0)	0 (49)	9 (0)
0 (49)	0 (0)	0 (51)	1 (0)	0 (50)	0 (0)	-	-	0 (50)	3 (2)	-	-
-	-	0 (51)	9 (0)	0 (50)	7 (0)	-	-	0 (50)	9 (1)	0 (49)	6 (3)
-	-	-	-	0 (50)	6 (0)	-	-	4 (50)	6 (0)	-	-
0 (50)	5 (0)	0 (51)	8 (0)	0 (50)	6 (0)	-	-	[3]10 (50)	10 (23)	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	0 (47)	0 (0)	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	0 (48)	8 (0)
-	-	-	-	0 (51)	6 (0)	-	-	-	-	-	-
0 (51)	8 (2)	-	-	0 (50)	7 (0)	-	-	0 (50)	3 (1)	-	-
-	-	-	-	0 (47)	1 (2)	-	-	-	-	0 (47)	0 (0)
0 (49)	7 (17)	0 (51)	0 (0)	0 (50)	0 (0)	-	-	0 (50)	0 (0)	-	-
-	-	-	-	-	-	-	-	-	-	0 (47)	0 (0)
-	-	-	-	-	-	-	-	-	-	0 (47)	0 (0)
-	-	-	-	0 (50)	4 (0)	-	-	0 (50)	0 (0)	0 (47)	0 (0)
0 (49)	10 (1)	0 (51)	9 (0)	0 (50)	6 (1)	-	-	[5]4 (50)	9 (3)	-	-
0 (49)	10 (1)	-	-	0 (47)	9 (1)	-	-	0 (50)	10 (0)	-	-
0 (49)	9 (1)	-	-	0 (47)	10 (2)	-	-	0 (50)	5 (2)	0 (47)	1 (0)
0 (49)	8 (0)	0 (51)	7 (0)	0 (50)	9 (0)	-	-	0 (50)	8 (1)	0 (48)	6 (0)
0 (49)	9 (2)	0 (51)	5 (0)	5 (50)	7 (0)	-	-	0 (50)	4 (0)	-	-
-	-	-	-	0 (46)	5 (19)	-	-	-	-	-	-
-	-	-	-	0 (46)	4 (1)	[3]8 (46)	8 (27)	0 (50)	10 (0)	-	-

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Sorghum sudanense	-	-	0 (47)	8 (0)	0 (48)	4 (1)	-	-
Sporobolus airoides	-	-	0 (51)	6 (0)	0 (51)	5 (0)	-	-
S. asper	-	-	0 (47)	2 (0)	0 (48)	5 (1)	-	-
S. contractus	-	-	0 (51)	6 (0)	0 (51)	5 (0)	-	-
S. cryptandrus	-	-	0 (49)	1 (0)	0 (51)	8 (0)	0 (50)	4 (2)
S. fimbriatus	-	-	0 (49)	0 (0)	0 (50)	0 (0)	-	-
S. flexuosus	-	-	0 (47)	0 (0)	0 (51)	6 (0)	-	-
S. giganteus	-	-	0 (47)	0 (0)	0 (50)	0 (0)	-	-
S. purpurascens	-	-	0 (47)	0 (0)	0 (48)	0 (0)	-	-
S. wrightii	-	-	0 (49)	0 (0)	0 (50)	0 (0)	-	-
Stipa columbiana	-	-	0 (46)	0 (0)	0 (48)	0 (0)	-	-
S. comata	-	-	0 (47)	0 (0)	-	-	-	-
S. variabilis	-	-	0 (51)	4 (0)	0 (51)	6 (0)	-	-
S. viridula	-	-	0 (51)	3 (0)	0 (48)	6 (2)	-	-
Trichachne californica	-	-	0 (47)	6 (0)	0 (50)	0 (0)	-	-
Trifolium fragiferum	-	-	0 (46)	6 (0)	-	-	-	-
T. hybridum	-	-	0 (46)	6 (0)	-	-	-	-
T. pratense	-	-	0 (47)	6 (0)	-	-	-	-
T. repens	-	-	0 (47)	5 (0)	-	-	-	-
Trigonella foenum-graecum	-	-	-	-	0 (48)	0 (0)	-	-
T. monspeliaca	-	-	-	-	-	-	-	-
Tridens flava	-	-	0 (47)	0 (0)	0 (50)	0 (0)	-	-
T. muticus	-	-	0 (47)	3 (0)	1 (50)	3 (3)	-	-

See footnotes at end of table.

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
-	-	-	-	0 (47)	1 (0)	-	-	-	-	-	-
0 (51)	8 (0)	6 (51)	6 (0)	0 (51)	4 (0)	-	-	0 (50)	7 (16)	0 (47)	0 (0)
0 (49)	4 (17)	0 (51)	4 (0)	0 (47)	1 (3)	-	-	1 (50)	4 (3)	0 (49)	1 (3)
0 (49)	5 (3)	0 (51)	8 (0)	0 (51)	7 (0)	-	-	1 (50)	8 (3)	0 (49)	2 (2)
0 (49)	8 (8)	1 (51)	7 (0)	0 (50)	7 (3)	-	-	0 (50)	9 (1)	1 (49)	5 (17)
-	-	0 (51)	7 (0)	0 (46)	1 (5)	-	-	0 (50)	8 (3)	-	-
0 (51)	7 (15)	0 (51)	7 (0)	0 (50)	3 (4)	-	-	0 (50)	9 (3)	0 (49)	4 (3)
-	-	-	-	0 (47)	0 (0)	-	-	-	-	0 (49)	2 (3)
-	-	-	-	-	-	-	-	-	-	-	-
0 (49)	6 (0)	0 (51)	6 (6)	0 (50)	0 (0)	-	-	[5]10 (50)	10 (16)	-	-
-	-	-	-	-	-	-	-	-	-	0 (47)	0 (0)
-	-	-	-	0 (47)	1 (2)	-	-	-	-	0 (47)	0 (0)
0 (51)	6 (0)	0 (51)	9 (0)	0 (51)	8 (0)	-	-	0 (50)	6 (1)	-	-
0 (49)	8 (5)	0 (51)	6 (0)	0 (51)	6 (0)	-	-	2 (50)	4 (4)	0 (48)	2 (1)
-	-	-	-	-	-	-	-	-	-	0 (48)	4 (0)
-	-	-	-	0 (47)	1 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	1 (2)	-	-	-	-	-	-
-	-	-	-	0 (47)	1 (2)	-	-	-	-	-	-
-	-	-	-	0 (47)	3 (0)	-	-	-	-	-	-
-	-	-	-	0 (50)	5 (0)	-	-	0 (50)	6 (0)	-	-
-	-	-	-	0 (50)	9 (0)	-	-	-	-	0 (47)	2 (1)
0 (49)	0 (0)	-	-	0 (47)	0 (0)	-	-	0 (50)	0 (0)	-	-
-	-	-	-	0 (50)	4 (3)	0 (46)	0 (0)	-	-	0 (49)	4 (4)

TABLE 3.--*Final rating, planting year, maximum rating, and maximum*

Species and variety	Buckhead Mesa		Dog Knobs		Drake		Moritz Lake	
	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
Vicia atropurpurea	-	-	0 (46)	7 (0)	-	-	-	-
V. californica	-	-	-	-	0 (48)	1 (1)	-	-
V. noeana	-	-	0 (49)	5 (0)	0 (48)	7 (1)	-	-
V. sativa	-	-	0 (47)	6 (0)	-	-	-	-
V. villosa	-	-	0 (46)	7 (0)	-	-	-	-

[1]First figures are the final rating; second figures (in parentheses) are the planting year. Final
[2]First figures are the maximum rating; second figures (in parentheses) are the age at which the
[3]Spreading vegetatively at time of final observation.
[4]Species or variety not planted.
[5]Spreading by natural seeding at time of final observation.

TABLE 4.--*Ratings, planting years, and age at time of maximum rating*

Site, species, and variety	Final rating[1]	Maximum rating[2]
DOG KNOBS		
Andropogon perforatus	0(47)	3(0)
Bromus coloratus	0(46)	2(0)
B. mollis	0(46)	4(0)
Elyonurus barbiculmis	0(47)	0(0)
Eragrostis secundiflora	0(47)	4(0)
Hordeum nodosum	0(49)	0(0)
Medicago hispida	0(49)	5(0)
Muhlenbergia setifolia	0(47)	0(0)
Sporobolus texanus	0(47)	0(0)
DRAKE		
Astrebla lappacea	0(48)	0(0)
A. pectinata	0(48)	0(0)
Bouteloua parryi	0(48)	0(0)
Cassia leptocarpa	0(48)	0(0)
DRAKE (continued)		
Chloris gayana	0(48)	0(0)
C. radiata	0(48)	0(0)
Dalea frutescens	0(48)	0(0)
D. greggi	0(48)	0(0)
Galactia wrightii	0(48)	0(0)
Hilaria belangeri	0(48)	0(0)
Hyparrhenia hirta	0(48)	0(0)
H. rufa	0(48)	0(0)
Muhlenbergia parviglumis	0(48)	0(0)
Paspalum stramineum	0(48)	0(0)
Pentzia incana	0(48)	0(0)
Phaseolus wrightii	0(48)	0(0)
Sorghastrum elliotti	0(48)	0(0)
Trigonella corniculata	0(48)	5(1)
Vicia cracca	0(48)	0(0)
V. exigua	0(48)	0(0)

[1]First figures are the final rating; second figures (in parentheses) are the planting year. Final
[2]First figures are the maximum rating; second figures (in parentheses) are the age at which the

rating age for plantings at 10 pinyon-juniper sites--Continued

Mud Tanks		Perkinsville		Peterson Flat		Pine Creek		Pleasant Valley		Sierra Ancha	
Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating	Final rating	Maximum rating
-	-	-	-	0 (47)	3 (0)	-	-	-	-	0 (47)	0 (0)
-	-	-	-	-	-	-	-	0 (50)	5 (0)	-	-
-	-	-	-	-	-	-	-	0 (50)	0 (0)	-	-
-	-	-	-	0 (47)	5 (0)	-	-	-	-	-	-
-	-	-	-	0 (47)	5 (0)	-	-	-	-	0 (47)	1 (0)

ratings made September 10 through October 3, 1973.
maximum rating occurred.

for species and varieties planted at a single pinyon-juniper site

Site, species, and variety	Final rating[1]	Maximum rating[2]
PETERSON FLAT		
Blepharoneuron tricholepis	0(47)	0(0)
Bromus carinatus-Bromar	0(50)	6(0)
Elymus condensatus	0(46)	1(3)
E. pseudoagropyron	0(46)	1(3)
E. sabulosus	0(50)	0(0)
Festuca arizonica	0(47)	4(4)
F. rubra-cummutata	0(47)	6(2)
Lathyrus sylvestris	0(50)	0(0)
Phalaris arundinacea	0(50)	0(0)
Phleum pratense	0(50)	6(0)
Poa compressa	0(50)	4(15)
P. pratensis	6(46)	7(7)
P. scabrella	0(50)	5(0)
P. trivialis	0(50)	6(0)
PLEASANT VALLEY		
Onobrychis laconica	0(50)	0(0)
SIERRA ANCHA		
Bromus polyanthus	0(47)	0(0)
Eragrostis echinochloidea	0(49)	6(0)
Krameria parvifolia-glandulosa	0(49)	0(0)
Lathyrus annus	0(47)	0(0)
Leptochloa dubia	0(48)	8(0)
Lolium subulatum	0(47)	3(1)
Panicum prolutum	0(47)	1(0)
P. reverchoni	0(47)	0(0)
Pennisetum ciliare	0(48)	8(0)

ratings made September 10 through October 3, 1973.
maximum rating occurred.

GPO 791-178

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